



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,380	02/01/2001	Mitsue Miyazaki	2382-16	3974

7590 09/25/2002

NIXON & VANDERHYTE P.C.  
8th Floor  
1100 North Glebe Road  
Arlington, VA 22201

EXAMINER

LIN, JEYUHU

ART UNIT

PAPER NUMBER

3737

DATE MAILED: 09/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/773,380

Applicant(s)

MIYAZAKI ET AL. *Ch*

Examiner

Jeoyuh Lin

Art Unit

3737

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 10, 11 and 14-56 is/are rejected.
- 7) ☒ Claim(s) 4-9, 12, and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 23 is objected to because of the following informalities: in line 2, the word, "mans" should be spelled, "means". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

-Claims 15, 18-50, and 53-56 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In Claims 15, 20, 49, and 53, the limitation, "means for executing a pulse sequence including readout gradient pulse of which applied direction is substantially parallel to a moving direction of the fluid" is not described by the specification.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 3737

-Claims 19 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by O'Donnell (US 4,609,872).

O'Donnell teaches an MR blood flow imaging, comprising the following structures:

-A scanning means for performing a scan to acquire at least an echo signal.

(Column 7, lines 42-48)

-Applying a gradient pulse in the direction of the blood flow. (Column 5, lines 55-65)

-Image producing means to produce an image of the fluid, in this case, of blood, and a parenchymal portion of the object influenced by the fluid. (Column 16, lines 4-57)

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

-Claims 1-3, 10, 11, 14, 51, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mistretta. (US 5,830,143)

Mistretta teaches an MRA imaging device, comprising the following structures:

-An rf coil. (Column 6, lines 5-50)

-A transmitter to generate rf pulse sequences. (Column 6, line 26)

-A gradient power supply to apply a gradient. (Column 5, lines 55-60)

-A receiver for receiving echo signal through the RF coil device. (Column 6, line 27)

-A calculating unit to produce echo signals into an image. (Column 12, lines 10-48)

-A controller (Column 6, line 30)

-Time phase setting means for setting a plurality of cardiac time phases, namely at systole and diastole. (Column 12, lines 15-20)

-Acquiring a plurality of echo data (Column 7, lines 55-63) at the cardiac time phases, such as the systolic and diastolic phase. (Column 12, lines 20-25)

-Producing an angiogram, which may be 3D, (Column 4, line 25) which would inherently include both the fluid in the region, and the parenchymal region, in this case, the vasculature.

-Using the Fourier technique to process image data. (Column 6, lines 15-23)

Mistretta fails to teach acquiring data reflective of the systolic phase prior to that of the diastolic phase. However, it is well known in the art that one may acquire either diastolic or systolic phase of imaging data first, depending on the design choice of the user. Mistretta also fails to teach having a magnet for generating a static magnetic field. However, it is well known in the art of magnetic resonance imaging to use a magnet to generate a static field in which an object is placed.

-Claims 15-18, 20, 36, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mistretta, as applied in claim 1 above, and further in view of O'Donnell.

Mistretta meets all the claims except that it fails to teach applying a readout gradient pulse that is parallel to a moving direction of fluid in motion within the object. O'Donnell teaches such a feature, as cited above. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt O'Donnell's teachings to Mistretta's device such that a faster image acquire and a more detailed image may be generated.

***Allowable Subject Matter***

6. Claims 4-9, 12, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

-Kanayama et al. (US 5,565,777) teaches NMR imaging of blood flow in the body, such as the brain, comprising structures for static magnetic and rf coil imaging and the possibility of using the device along with ECG for gating imaging.

-Roberts et al. (US 5,417,214) teaches coronary angiogram generation comprising cardiac cycle gating, pulse sequence at both diastole and systole, and application of rf pulses in the direction transverse to fluid flow and gradient.

-Roberts et al. (US 5,320,099) teaches coronary angiogram generation comprising data collection and pulse imaging at systole and diastole. (Columns 14 and 15)

-Miyazaki et al. (US 6,320,377 B1) teaches a MR imaging method comprising obtaining image slices parallel to the arterial flow. However, it fails to teach applying image gradient slice parallel to a moving direction of fluid in motion within the object.

-Makita et al. (US 6,043,655) teaches an MR technique to enhance blood flow imaging, comprising a gradient field application, (Column 4, lines 24-36), rf coil, (Column 4, lines 51-61)controller, (Column 4, lines 63-67) applying Fourier transform for image reconstruction, (Column 5, lines 50-53) and ECG gating. However, it fails to teach applying a gradient. (Column 6, lines 14-26)


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeoyuh Lin whose telephone number is (703) 306-5990. The examiner can normally be reached on m-f, 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marvin Lateef can be reached on (703) 308-3256. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-0758 for regular communications and (703) 308-0758 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0858.

JYL

JYL  
September 19, 2002

  
George Manuel  
Primary Examiner